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BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

BOB BURNS, Chairman
BOYD DUNN
SANDRA D. KENNEDY
JUSTIN OLSON
LEA MÁRQUEZ PETERSON

IN THE MATTER OF THE APPLICATION
OF ARIZONA PUBLIC SERVICE
COMPANY FOR APPROVAL OF ITS 2020
RENEWABLE ENERGY STANDARD
IMPLEMENTATION PLAN FOR RESET OF
RENEWABLE ENERGY ADJUSTOR.

DOCKET NO. E-01345A-19-0148

**SUPPLEMENT TO THE
APPLICATION FOR APPROVAL
OF 2020 RENEWABLE ENERGY
STANDARD IMPLEMENTATION
PLAN**

Arizona Public Service Company (APS or Company) supplements its 2020 Renewable Energy Standard (RES) Implementation Plan (2020 RES Plan) with a Residential Energy Storage Pilot proposal, detailed in Attachment A, which was developed in collaboration with the storage industry and local stakeholders. This pilot is designed to meet the Arizona Corporation Commission's (ACC or Commission) objectives to encourage battery storage adoption and provide opportunities for customer bill savings while also providing valuable data and findings that will inform future energy storage programs. This pilot will be an important and prudent step on the path to meeting clean energy goals for Arizona.

1 **I. RESIDENTIAL ENERGY STORAGE PILOT**

2 In accordance with Staff's request, APS proposes the following Residential Energy
3 Storage Pilot as a supplement to the 2020 RES Plan. *See* ACC Staff's Energy Storage
4 Proposal, Docket No. E-01345A-19-0148 (Jan. 17, 2020); *see also* Chairman Burns'
5 letter, Docket No. E-01933A-19-0028 (Jan. 22, 2020). APS requests approval of its
6 Residential Energy Storage Pilot proposal that provides the following benefits:
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- 8 1. In exchange for a one-time incentive payment, customers will participate in
9 the pilot for three years and agree to connect their batteries to the APS
10 Resource Operating Platform (ROP), allowing APS to monitor their battery
11 performance. This will allow APS to analyze system performance with the
12 batteries in near real-time, which will provide valuable information on
13 battery performance across multiple battery types, vintages, and operating
14 conditions and provide important data regarding potential utility dispatch
15 capabilities to inform a future potential 'pay-for-performance' shared
16 storage program and system planning to ensure continued reliability for
17 APS customers.
18 2. It will encourage customer use of existing battery systems to benefit the
19 grid.
20 3. It will provide valuable data to compare the performance of newer and older
21 battery systems.

22 APS proposes that this pilot be moved to and included in its portfolio of Demand
23 Side Management (DSM) programs in 2021. The Residential Energy Storage Pilot will
24 function more like a DSM program, and will be integrated into the ROP within the
25 Company's DSM portfolio that enables aggregation of distributed energy resource (DER)
26 technologies including smart thermostats, connected water heaters, battery storage, and
27 solar inverters (that is, DERs that are being funded and reported within DSM). In order
28

1 to better align the Residential Energy Storage Pilot with other DER technologies that are
2 integrated with the ROP, the Company proposes to incorporate this pilot into its 2021
3 DSM Implementation Plan (to be filed on or before December 31, 2020) for operating,
4 funding, and reporting purposes. The Company will file an end of pilot evaluation report
5 discussing the pilot's technical, market and realized potential by measuring pilot demand
6 and energy impacts; and by assessing equipment specifications, operations and
7 performance; DER integration and resource operating platform management; rate-driven
8 dispatch, cost-effectiveness; customer experience; customer education and
9 communication; and other relevant pilot findings.

10 **II. PILOT FUNDING**

11 As discussed above, the Company proposes to incorporate this pilot into its 2021
12 DSM Implementation Plan (to be filed on or before December 31, 2020) for operating,
13 funding and reporting purposes, in order to better align the Residential Energy Storage
14 Pilot with other DER technologies that are integrated with the ROP. APS will propose in
15 its 2021 DSM Implementation Plan to fund the Residential Energy Storage Pilot at \$3
16 million for the three-year pilot through DSM budgets in program years 2021-2024. To
17 prepare administratively for the pilot launch, APS anticipates it may spend a nominal
18 portion of its filed 2020 RES budget. This approach requires no change to the previously
19 filed 2020 RES budget or adjustor.

20 **III. CONCLUSION**

21 APS's Residential Energy Storage Pilot is designed to encourage the adoption of
22 battery storage technology and provide potential energy bill savings for customers. The
23 Company respectfully requests that the Commission approves APS's supplement to its
24 2020 RES Plan as proposed.

25
26 RESPECTFULLY SUBMITTED this 26th day of August 2020.
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/s/ Rachael Leonard
By: _____
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Rachael Leonard
Attorneys for Arizona Public Service Company

Electronically filed this 26th day
of August 2020 with:

Docket Control
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COPY of the foregoing emailed/delivered
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s/TD

Attachment A

APS Residential Energy Storage Pilot

Introduction

Arizona Public Service Company (APS or Company) supplements its 2020 Renewable Energy Standard (RES) Implementation Plan (2020 RES Plan) with a Residential Energy Storage Pilot proposal, which was developed in collaboration with the storage industry and local stakeholders. This pilot is designed to meet the Arizona Corporation Commission's (ACC or Commission) objectives to encourage battery storage adoption and provide opportunities for customer bill savings while also providing valuable data and findings that will inform future energy storage programs. In accordance with Staff's request, APS proposes the following Residential Energy Storage Pilot as a supplement to the 2020 RES Plan. See ACC Staff's Energy Storage Proposal, Docket No. E-01345A-19-0148 (Jan. 17, 2020); *see also* Chairman Burns' letter, Docket No. E-01933A-19-0028 (Jan. 22, 2020).

This pilot will be an important and prudent step on the path to meeting clean energy goals for Arizona.

In order to fulfill its clean energy commitment to provide 100% carbon-free energy by 2050, APS is proactively developing flexible distributed resources to enable APS to better align energy demand with times when carbon-free renewable energy is available. To manage these resources, in partnership with EnergyHub, APS has built an award-winning Resource Operating Platform (ROP) within the Company's Demand Side Management (DSM) portfolio that enables aggregation of distributed energy resource (DER) technologies including smart thermostats, connected water heaters, battery storage, and solar inverters. APS is currently scaling this platform with a goal of having 35,000 smart thermostats connected by the end of 2020, with a forecasted collective impact of more than 50 MWs of 2-hour dispatchable distributed capacity from this technology alone.

The APS ROP currently has 35 APS-owned, residentially-sited batteries connected as part of the Commission-approved Storage Rewards program. As battery storage technology matures and becomes more widely adopted, APS is looking forward to integrating additional connected residential storage capacity into the platform. Because customer-sited batteries offer opportunities for energy storage and load shifting, they are forecasted to be one of the key distributed energy resource technologies in the future.

While this is an exciting future trajectory, it is also important to acknowledge that energy storage technology is still in an early state of maturity, and for most residential applications, batteries are generally far from being cost-effective or providing sufficient customer payback in energy savings to cover their high upfront costs today. By comparison, other distributed energy resource technologies such as smart thermostats and connected water heater controls can offer significant aggregated energy storage and load shifting capacity with rapid customer payback periods that make them cost-effective. Moreover, the high heat in Arizona has the potential to hamper battery storage performance in terms of reduced capacity, less reliable operation and reduced battery life. While it is important to invest in and learn about battery storage, there is risk in over-investing in the technology prematurely while costs are high and performance is not well documented. As such, it is prudent to take a measured approach to a battery storage pilot to learn more about the technology before APS attempts to scale a residential battery storage capacity program at this time.

APS Residential Energy Storage Pilot

Despite these challenges, the large upfront cost, and long paybacks for residential energy storage systems, some customers are adopting batteries, with approximately 800 systems currently installed in APS's service territory. APS seeks to partner with residential customers who opt to purchase, install, and operate batteries at their homes. The proposed **APS Residential Energy Storage Pilot** seeks to incentivize these customers to share the value of their batteries by dispatching during on-peak hours and by integrating with the APS ROP so that their batteries can provide performance data that will inform future system planning and the evolution of program design for this technology.

The APS Residential Energy Storage Pilot is designed to provide participating customers with a one-time incentive payment of \$300/kW, up to a maximum of \$1,500 per home (existing batteries) and \$2,500 per home (newly installed batteries) for qualifying residential battery storage systems that are integrated into the APS ROP to share their performance data. In exchange for this financial incentive, participating customers commit to operate their batteries in discharge mode during on-peak periods (3-8 pm weekdays, non-holidays); agree to allow their batteries to connect to the APS ROP and share battery performance data throughout the time of their participation in the pilot; and to enroll (or maintain their enrollment if already enrolled) in a time-of-use (TOU) or TOU-plus-demand service plan. This is a flexible rate requirement that allows participants to choose from a variety of time-differentiated service plans that help enable their battery storage systems to provide ongoing bill savings. If batteries are not combined with time-differentiated and/or demand-based service plans, participating APS customers will not realize savings on their energy bill. This rate requirement will be waived for participants who are currently enrolled in grandfathered solar rates and do not want to switch.

The design of the APS Residential Energy Storage Pilot is similar to program designs that have been proposed and/or are currently being offered by other regional utilities. This design represents a smart approach to learn more about residential battery performance and encourage the ongoing market evolution of batteries, while helping to integrate flexible distributed capacity onto the grid that can be scaled in the future without unduly subsidizing an emerging technology that is still early in its maturation.

Objectives

This pilot is designed to achieve the following objectives:

- Encourage customers who own batteries to connect to the APS ROP and share battery performance data.
- Encourage customers who own batteries to participate in TOU or TOU-plus-demand service plans that will provide ongoing bill savings opportunities.
- Test a program design that integrates batteries into the ROP and provides performance data that will help to scale distributed energy storage capacity on the grid while minimizing cross subsidization.
- Provide valuable research about the integration of emerging distributed battery storage technologies on the grid by studying battery performance with multiple types and vintages of products as they function in a variety of conditions.

APS Residential Energy Storage Pilot

- Inform future program design by studying customer economics, use cases, and interactions with APS service plans to better understand customer and utility benefits and risks.
- Help manage peak energy demand on the grid by requiring a commitment to dispatch batteries during on-peak periods.
- Incentivize residential battery-to-grid integration that will benefit all customers, without unduly subsidizing battery acquisition or creating an overreliance on incentives once the market has matured.
- Improve understanding of how reliable distributed battery capacity can help meet clean energy goals.

Incentive Design

APS is proposing a simple, straightforward incentive design to encourage customer participation in the pilot program. Participating customers will receive a one-time upfront incentive when they sign up to participate in the pilot and connect their battery storage system to the APS ROP for data sharing. The incentives will be based on the total kW capacity of the battery storage system, with a one-time incentive of \$300/kW of rated storage capacity, capped at a total amount of no more than \$1,500 per home for existing systems and \$2,500 per home for new systems and paid directly to the APS customer of record. These caps will help to ensure that incentives are available to a greater number of customers by assuring that large battery systems do not consume a disproportionate share of the incentive budget.

In order to receive the incentive, the customer and battery storage system must meet all program eligibility and qualification requirements. Participating battery storage systems must be integrated into the APS ROP to share battery performance data, and customers must commit to providing battery performance data for the three-year duration of their participation in the pilot.

APS developed the pilot program incentive structure in collaboration with battery manufacturers, other local and national industry stakeholders, and EnergyHub. APS has designed the incentive structure to encourage pilot program participation among battery owners, while simultaneously keeping costs relatively low to strike the right balance for the pilot.

The pilot will provide valuable data that will inform future battery storage program design, including a potential future 'pay-for-performance' shared battery capacity demand response program. APS will monitor pilot participation, customer and grid demand reduction, and other market conditions, and, if conditions warrant, then APS will submit a request for Commission approval to alter incentives and/or other elements of the pilot design as appropriate.

Pilot Implementation and Battery Data Share

- In exchange for a one-time incentive payment, customers will commit to participate in the pilot for a minimum of three years and agree to connect their batteries to the APS ROP, allowing APS to monitor their battery performance. Note that APS anticipates a three-year participation enrollment period, with customers who enroll battery systems in years two and three of the pilot committing to data sharing agreements that will continue beyond the end date for pilot enrollment.
- APS will not manage or control operation of the battery during the pilot.

APS Residential Energy Storage Pilot

- Participating customers will be required to be on, or enroll in, a qualifying TOU or TOU-plus-demand service plan. This rate requirement will be waived for qualifying participants who are currently enrolled in a grandfathered solar rate. Participants on TOU or TOU-plus-demand plans will benefit from bill savings based on the battery operation to dispatch energy during on-peak hours to reduce peak energy use.
- Participating customers will commit to program and operate their battery to only draw power from the grid to charge the battery during APS off-peak periods and to discharge the battery only during the APS on-peak period of 3-8 pm weekdays. On weekend days or designated holidays, customers will be free to dispatch the battery when and how they see fit.
- Pilot implementation will allow APS to view the entire fleet of batteries and analyze system performance in near real-time. This is an important element of the pilot that will:
 - Require integration of the battery systems into APS's ROP;
 - Provide valuable information on battery performance across multiple battery types, vintages, and operating conditions;
 - Collect important data regarding potential utility dispatch capabilities to inform a potential 'pay for performance' shared storage program in the future.
- Eligible technologies: (1) battery systems must be integrated into the APS ROP through cloud-based application programming interface ("API") integration or other means for data sharing in order to participate; (2) APS receives access to near real-time battery performance data on the ROP platform; (3) battery storage systems have a minimum energy storage nameplate capacity of at least 8 kWh.
- The Residential Energy Storage Pilot will provide a list of qualifying battery storage systems that can integrate with APS's ROP, meet the Company's grid interconnection requirements, and are eligible to participate in the program. Current eligible systems include those provided by Tesla, Solar Edge/LG Chem, Sonnen, Generac, Sunrun, and Sunverge. APS reserves the right to update this list as vendor eligibility changes.

Participation Goals

APS proposes a three-year pilot with an overall budget of \$3 million, which is forecasted to accommodate approximately 900 participating battery storage systems, composed of approximately 500 newly installed battery systems and 400 existing battery systems. This split will be important for these reasons:

- It will encourage customer use of existing battery systems to benefit the grid instead of sitting dormant as a backup power source only.
- It will help to establish a viable sample size in the early years of the pilot by enrolling a larger number of existing battery systems during the first two years while allowing for a ramp-up of new battery system enrollments over time.
- It will provide valuable data to compare the performance of newer and older battery systems. Forecast participation numbers by year are shown in Table 1 below.

To maintain an appropriate split in customer participation, existing batteries will be limited to 400. Initially, to maintain diversity of the pilot, overall participation will be capped at no more than 40% of the total participating batteries by any individual battery manufacturer. This cap will be monitored and adjusted as appropriate as the pilot proceeds.

APS Residential Energy Storage Pilot

Budget

The proposed budget for the three-year pilot is \$3 million, as shown in Table 1. This budget covers all direct-to-customer incentives, annual access fees for the ROP, data fees and miscellaneous setup fees to be paid directly to battery manufacturers, marketing and outreach, management and administration, and pilot evaluation and reporting activities.

Table 1 Pilot Participation and Budget

	Year 1	Year 2	Year 3	Total Pilot
Participating Batteries (TOTAL)	350	250	300	900
Existing	250	100	50	400
New	100	150	250	500
Installed kW Capacity (avg 8 kW)	2800	2000	2400	7200
Customer Incentives				
Existing (cap \$1500/home)	\$375,000	\$150,000	\$75,000	\$600,000
New (cap \$2500/home)	\$240,000	\$360,000	\$600,000	\$1,200,000
TOTAL	\$615,000	\$510,000	\$675,000	\$1,800,000
Platform Fee (ROP)	\$75,000	\$75,000	\$75,000	\$225,000
Vendor Data Fees	\$31,150	\$22,250	\$26,700	\$80,100
Setup Fees/Misc	\$60,000	\$50,000	\$14,900	\$124,900
Marketing/Outreach	\$40,000	\$40,000	\$40,000	\$120,000
Management/Administration	\$140,000	\$140,000	\$140,000	\$420,000
Evaluation/Reporting	\$50,000	\$80,000	\$100,000	\$230,000
TOTAL				\$3,000,000

Training and Technology Support

APS will develop and provide educational materials for customers and training materials/sales tools for contractors to help them understand the pilot requirements, including qualifying manufacturers and associated equipment specifications, and the most appropriate service plans for participating customers.

Pilot Evaluation

The pilot offers a valuable opportunity for research and data collection on customer-operated battery storage systems, including technical considerations, customer experience, and cybersecurity issues that will provide foundational knowledge about this technology. Outcomes of this pilot may also inform the design of a future residential battery storage pilot that pays customers for battery discharge to the grid during specific time periods or during specific demand response curtailment events.

Pilot Funding and Reporting

In response to the Arizona Corporation Commission Staff request, APS is filing this proposed pilot as an amendment to its 2020 RES Implementation Plan. However, the Residential Energy Storage Pilot will function more like a DSM program, and will be integrated into the APS ROP with other distributed energy resources that are being funded and reported within DSM. In order to better align the Residential Energy Storage Pilot with other DER technologies that are integrated with the

APS Residential Energy Storage Pilot

ROP, the Company proposes to incorporate this pilot into its 2021 DSM Implementation Plan (to be filed on or before December 31, 2020) for operating, funding, and reporting purposes. The Company will also file an end of pilot evaluation report discussing the pilot's technical, market, and realized potential by measuring pilot demand and energy impacts; and by assessing equipment specifications, operations and performance; DER integration and ROP management; rate-driven dispatch, cost-effectiveness; customer experience; customer education and communication; and other relevant pilot findings.

Conclusion

The proposed APS Residential Energy Storage Pilot program was developed in collaboration with the storage industry and local stakeholders. It is designed to meet the Commission's objectives to encourage battery storage adoption and provide opportunities for customer bill savings while also providing valuable data and findings that will inform future energy storage programs. This pilot will be an important and prudent step on the path to meeting clean energy goals for Arizona.